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TO THE

MATHEMATICAL GAZETTE

No. 298, FEBRUARY 1948—No. 302, DECEMBER 1948.

ARTICLES.

MATHEMATICAL NOTES.

REVIEWS AND NOTICES.

NEWS OF BRANCHES.

GLEANINGS FAR AND NEAR.

The Gleanings in No. 300 (1560–1581) were items reprinted from earlier numbers.

OBITUARY NOTICE.

CORRESPONDENCE.

MISCELLANEOUS.

PLATES.

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BRISTOL BRANCH.

1946-7 session concluded with a paper by a local member, Mr. E. T. Gill, The Use of the Puzzle in the Teaching of Mathematics ".

e success of this session's meetings and the growth of membership pted the Branch committee to apply for representation on the Council e Mathematical Association. Upon approval of this application in June, D. R. Baldwin was elected as the Branch representative on the Council.

ofessor H. R. Hassé's term of office as President of the Branch expired 47, and Mr. G. W. Hinton was elected as his successor. Professor Hassé one of the original founders of the Branch in 1920, and a tribute to his in his long association with the Branch was paid by Mr. Hinton.

o meetings of the 1947–8 session have been held. Mr. W. Hope-Jones from Eton to speak on " Can We Teach more Mathematical Geography? " Mr. L. Smith, Principal of Redland Training College, talked on " Mathe- cs for the Teacher in Training ".

Friday, 6th February, 1948, Mr. C. W. Tregenza is visiting the Branch, " Graphs " as his subject. The final meeting of the session is on Friday, March, 1948, to discuss the working of the Alternative Syllabus in the ols.

J. K. DUDLEY, *Hon. Sec.*

NEW SOUTH WALES BRANCH.

REPORT FOR 1947.

NG the year five meetings were held; the following were the more rtant items of business:

Discussion of the mathematical papers set for the Leaving Certificate the Intermediate Certificate, 1946.

Addresses, etc.:

(*a*) Professor Room: Strange arithmetic in strange places.

(*b*) Mr. Kirkpatrick: Alignment charts.

(*c*) Mr. V. Barnes: A nomograph developed in the war period for use with 18-pounder field guns.

(*d*) Discussion introduced by Mr. P. G. Price on the use of standardised tests; in particular, the A.C.F.R. tests in arithmetic.

(*e*) Exhibition of mathematical films, arranged by Dr. Turner.

Following on (*d*) above, an investigation has been begun on the question uitable courses of study for those pupils now in secondary schools of ous types, and for whom it is felt that the present courses are unsuitable. I. Barnes has agreed to take charge of this investigation, with power to pt members as helpers, and to collect evidence and opinions from teachers.

he *Australian Mathematics Teacher* has completed three years of publica- ; and from every point of view, the venture has been successful. There now more than 700 subscribers, coming from every Australian state, New land, South Africa, Great Britain, Eire, U.S.A., Hong Kong, India; and quest for copies from Roumania. Apart from the inevitable work entailed he production of such a journal, difficulties still being experienced by the ting trade make it impossible to have the journal issued at the prescribed .

he appreciative references of the retiring President of the Mathematical ociation, Mr. W. F. Bushell, in his Presidential Address last April, are e stimulating. It was also a very kindly action of the Editor of the *hematical Gazette* to note the efforts of the *A.M.T.* during 1946.

The financial position of the Branch is satisfactory, especially when considers such adverse factors as high costs of printing, and low subscri rates. The latter is a matter of policy ; it is felt that every teacher of ma matics in every type of school should be a subscriber ; with the low ra subscription this aim is more likely to be accomplished.

At the annual meeting office-bearers for 1948 were elected as foll *President* : Bro. Liguori ; *Vice-Presidents* : Professor Wellish, Mr. P Price ; *Joint Hon. Secretaries* : Miss I. Barnes, Mr. H. J. Meldrum ; *Treasurer* : Mr. R. J. Gillings ; *Director of the Problem Bureau* : Mr. Gillings ; *Editorial Committee* : Dr. Turner (Chairman), the Executive Of of the Branch, Mr. W. B. Smith-White, Mr. H. Mulhall, Mr. P. G. Price.

I. BARNES, H. J. MELD

BOOKS RECEIVED FOR REVIEW.

L. J. Comrie. *Chambers's four-figure mathematical tables.* Pp. 64. Limp cloth boards, 6s. 1947. (Chambers)

Nicolaus Copernicus. *De Revolutionibus.* Preface and Book I. Translation by Dobson and S. Brodetsky. Pp. 32. 3s. 6d. 1947. (Royal Astronomical Society)

J. Crank. *The differential analyser.* Pp. viii, 137. 10s. 6d. 1947. (Longmans)

J. B. Dale. *Logarithmic and trigonometric tables.* 2nd edition (re-set). Pp. 42. 2 1947. (Arnold)

C. V. Durell. *General mathematics. IV.* Pp. xl, 296, xxxvi. 6s. ; without ans 5s. 6d. 1947. (Bell)

T. Fort. *Finite differences and difference equations in the real domain.* Pp. vii 25s. 1948. (Oxford University Press)

R. L. Goodstein. *A textbook of mathematical analysis. The uniform calculus a applications.* Pp. xii, 475. 30s. 1948. (Oxford University Press)

F. Goodyear. *The junior draughtsman. III.* Pp. 52. 1947. *Teacher's hand* Pp. 20. 1948. 2s. 6d. (University of London Press)

L. Herman and **C. Ross.** *Algebra for school certificate and matriculation. I.* Pp 2s. 6d. ; with answers, 2s. 9d. *II.* Pp. 248. 3s. 9d. ; with answers, 4s. *III.* Pp 3s. 6d. ; with answers, 3s. 9d. Complete in one volume, 7s. 3d. ; with answers, 8s. (Chambers)

T. H. Ward Hill. *Mathematics for modern schools. II.* Pp. 312. 6s. 6d. (Harrap)

W. V. D. Hodge and **D. Pedoe.** *Methods of algebraic geometry. I.* Pp. viii, 440. 1947. (Cambridge University Press)

F. B. Lennon. *Lewis Carroll.* Pp. 358. 15s. 1947. (Cassell)

A. Lichnerowicz. *Algèbre et analyse linéaires.* Pp. 316. 800 fr. 1947. (M Paris)

F. S. Nowlan. *College algebra.* Pp. xiv, 371. 18s. 1947. (McGraw-Hill)

A. Page. *Algebra.* Pp. vii, 346. 18s. 1947. (University of London Press)

J. F. Ritt. *Theory of functions.* Revised edition. Pp. x, 181. 16s. 1947. L graphed vari-typer script. (King's Crown Press, U.S.A. ; London, Geoffrey Cumbe

J. C. Slater and **N. H. Frank.** *Mechanics.* Pp. xiii, 297. 24s. 1947. (McGraw-H

A. Wald. *Sequential analysis.* Pp. xii, 212. 24s. 1947. (John Wiley, New Y Chapman & Hall, London)

S. A. Walling and **J. C. Hill.** *Modern mathematics.* Pp. vi, 153. 3s. 6d. *Note answers.* Pp. 16. 1s. 6d. 1948. (Cambridge University Press)

R. C. Yates. *A handbook on curves and their properties.* Pp. x, 245. $3.25. (Edwards, Ann Arbor, Mich.)

Five-figure tables of natural trigonometrical functions. Prepared by H.M. Nau Almanac Office. Pp. iv, 123. 15s. 1947. (H.M. Stationery Office)

A RESEARCH PROJECT.

THE Leicester Branch of the Mathematical Association has formed a research group. At a recent meeting, three members, E. H. Copsey, H. Frazer and W. W. Sawyer gave results to date.

We give below a brief summary of this research. The members of the Branch are to collaborate in obtaining further results. Any person interested in assisting is asked to communicate with the Secretary of the Leicester Branch : R. H. Collins, Gateway School, Leicester.

The object of the work is to discover the best possible expression for K in the inequality

$$\sum_{r=0}^{n} \sum_{s=0}^{n} \frac{a_r a_s}{r+s+1} \leqslant K \sum_{p=0}^{n} a_p^2, \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

where the a's are real and positive. Hilbert showed that

$$\sum_{r=0}^{\infty} \sum_{s=0}^{\infty} \frac{a_r a_s}{r+s+1} \leqslant \pi \sum_{0}^{\infty} a_p^2, \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

a result which can be proved by integrating $(\sum_0^n a_t z^t)^2$ round a closed contour consisting of a semicircle and a diameter. (See Hardy, Littlewood and Pólya, *Inequalities*, for various proofs of Hilbert's inequality.) In (2), π is the best possible constant, but H. Frazer showed (*Journ. London Math. Soc.*, 21, 1946) that $(n+1)\sin \pi/(n+1)$ is a better value of K in (1) than π, by integrating $(\sum_0^n a_t z^t)^2$ round a contour consisting of a regular polygon inscribed in a circle and a diameter. But this is still not the best possible value of K, as can be shown by the method which follows.

In inequality (1), if λ is the best possible constant, then λ is the maximum value of

$$\left\{ \sum_{r=0}^{n} \sum_{s=0}^{n} \frac{a_r a_s}{r+s+1} \right\} \Big/ \left\{ \sum_{p=0}^{n} a_p^2 \right\}.$$

The maximum value of this expression can be found by equating $\partial\lambda/\partial a_t$ to zero for each of the $(n+1)$ variables $a_0, a_1, a_2, \ldots a_n$, and eliminating the n independent variables $a_1/a_0, a_2/a_0, \ldots a_n/a_0$ from the $(n+1)$ equations. The result is

$$\begin{vmatrix} 1-\lambda & \frac{1}{2} & \frac{1}{3} & \frac{1}{4} & \cdots & \frac{1}{n+1} \\ \frac{1}{2} & \frac{1}{3}-\lambda & \frac{1}{4} & \frac{1}{5} & \cdots & \frac{1}{n+2} \\ \frac{1}{3} & \frac{1}{4} & \frac{1}{5}-\lambda & \frac{1}{6} & \cdots & \frac{1}{n+3} \\ \cdots & \cdots & \cdots & \cdots & \cdots & \cdots \\ \frac{1}{n+1} & \frac{1}{n+2} & \frac{1}{n+3} & \cdots & \cdots & \frac{1}{2n+1}-\lambda \end{vmatrix} = 0,$$

which when expanded is an equation of the $(n+1)$th degree in λ. The maximum root is the best possible value of the constant in (1), and is tabulated below, the value of $(n+1)\sin \pi/(n+1)$ being given for comparison ; the values of λ for $n = 3, 4, \ldots 19$, have been obtained by mechanical methods by the National Physical Laboratory and the Royal Aircraft Establishment.

n	λ (largest root)	$(n+1)\sin\pi/(n+1)$
0	1·00000	0
1	1·26759	2·00000
2	1·40832	2·59808
3	1·50021	2·82843
4	1·56705	2·93893
5	1·61890	3·00000
6	1·66089	3·03719
7	1·69594	3·06147
8	1·72588	3·07818
9	1·75192	3·09017
10	1·77488	3·09906
11	1·79537	3·10583
12	1·81383	3·11110
13	1·83059	3·11529
14	1·84593	3·11868
15	1·86004	3·12145
16	1·87309	3·12374
17	1·88522	3·12567
18	1·89654	3·12730
19	1·90714	3·12869

It would be useful to find the equation of the n, λ curve from the abo results. This has not yet been done although a fair approximation is

$$1/(\pi-\lambda) = 0{\cdot}12889 \log_e (n+\tfrac{3}{2}) + 0{\cdot}41538,$$

which was obtained empirically ; this result is within 1 per cent. up to $n=$ but gets steadily worse as n increases. The main problem is still to find th n, λ relation either empirically or by analytical considerations.

An account of this research has appeared in *Nature*, March 6th, 1948.

LEICESTER AND COUNTY BRANCH.

THIS Branch was founded in October 1947 and has some forty members. Fo meetings have been held. The first was a symposium, contributors bei Mr. R. H. Collins (Visual Aids in Grammar Schools), Mr. W. E. Date (Math matics in the Modern School), and Mr. R. Kitchen (The Technical School an Mathematics). Mr. I. R. Vesselo paid us a welcome visit and showed us som films and film strips, including one in the course of manufacture. On the 20 October (at which meeting the Branch was formally constituted) Mr. M. Moroney gave a talk on " Statistics in Schools and Industry ". A novel part the evening was a practical demonstration of statistical techniques. On th 13th February Mr. E. H. Copsey (Gateway School) brought along a group boys of 12+ and demonstrated his technique for teaching with the aid of film strip. At the same meeting Mrs. E. M. Williams (Principal, Humberston Training College) initiated a discussion on Mathematics and the Trainin College.

The first chairman of the Branch, Mr. W. W. Sawyer, has left us to take u an appointment at Achimota College. We shall miss him very much ; h initiative and drive were mainly responsible for the foundation of the Branc

A novel feature of our work has been the formation of a research grou

ome valuable work has been done and results to date were by Mr. E. H. Cop-ey, Dr. H. Frazer and Mr. W. W. Sawyer. Details will be found elsewhere in his *Gazette*.

The Officers are : Chairman, Professor R. L. Goodstein (University College, Leicester) ; Secretary, Mr. R. H. Collins (Gateway School, Leicester) ; Trea-urer, Miss F. E. Billsden (Newark Girls' School, Leicester).

R. H. COLLINS, *Hon. Sec.*

YORKSHIRE BRANCH.

REPORT FOR 1947.

Five meetings were held during the year.

On 15th March, a discussion on the new alternative syllabus in Mathematics or the J. M. B. School Certificate was opened by Mr. P. J. Wallis, who gave a rief history of movements for reforms in school certificate syllabuses and iscussed the main features of the new J. M. B. syllabus. Miss C. Bain, following, resented the point of view of a girls' school.

On 10th May, Mr. E. K. Clarke, Principal of Risley Training College, opened discussion on Mathematics in the Secondary Modern School. He outlined ome experimental work on mental age groups and attainments in Mathematics. Ir. J. A. Young and Mr. A. H. Hall, lecturers at Risley T. C., and a number of Modern School teachers contributed to an interesting discussion.

The Summer Meeting on June 14th was held at Harrogate Grammar School. Professor H. C. Ruse, Leeds University, gave a lecture entitled " What is Geometry? ", in which he outlined the early history of geometry and then ealt in greater detail with nineteenth and twentieth century developments in n attempt to find a satisfactory answer to the question.

On 18th October, Dr. B. L. Welch, Leeds University, spoke on " Statistics s a Subject in Schools and Universities ". He first described the extension of tatistical methods from social studies to the natural sciences and then xamined the possibility of teaching statistics in schools. At this meeting the Branch bade farewell to Mr. R. M. Gabriel, who had been appointed Professor f Mathematics at the University of Otago, New Zealand.

On 22nd November, Mr. C. W. Gilham, Leeds University, gave a paper ntitled " Can Its History Illuminate the Teaching of Mathematics? " He sed, as illustrations, number notation, some topics in the theory of numbers, he three classical problems in geometry, the history of π and some astronomy.

39 new members were accepted during the year and the meetings were all ell attended.

R. L. BOLT, *Hon. Sec.*

BOOKS RECEIVED FOR REVIEW.

H. V. Allen. *Intermediate commercial arithmetic.* 2nd edition. Pp. viii, 269. 5s. 947. (Longmans)

F. C. Atwood. *The solar system analysed.* Pp. 88. N. p. 1947. (Dawson Printing Co., uckland, N.Z.)

H. Beghin. *Cours de mécanique.* Pp. 602. 1800 fr. 1947. Édition provisoire polycopiée, fascicules. (Gauthier-Villars)

Ram Behari. *The differential geometry of ruled surfaces.* Pp. 94. N. p. 1946. Lucknow niversity Studies, XVIII. (University of Lucknow)

W. G. Borchardt. *Algebra for beginners.* Pp. vi, 272, xliv. With appendix : with nswers 5s., without answers 4s. 6d. ; without appendix : with answers, 4s. 6d., without nswers, 4s. 1948. (Rivingtons)

C. A. Coulson. *Electricity.* Pp. xii, 254. 10s. 6d. 1948. University Mathematical Texts. (Oliver and Boyd)

R. D. Douglass and D. P. Adams. *Elements of nomography.* Pp. ix, 209. $3.50. 1947. (McGraw-Hill)

C. V. Durell. *General mathematics : supplementary volume.* Pp. vii, 112, viii. 3s. 9d. 1948. (Bell)

W. L. Ferrar. *Higher algebra.* Pp. vi, 320. 17s. 6d. 1948. (Oxford University Press)

R. Fueter. *Das mathematische Werkzeug des Chemikers, Biologen, Statistikers und Soziologen.* 3rd edition. Pp. 308. Brosch. Sw. fr. 14 ; geb. Sw. fr. 18.50. 1947. (Orell Füssli, Zürich)

M. E. J. Gheury de Bray. *Elementary hyperbolics.* (Re-issue.) Pp. xi, 351 ; xii, 20[illegible] 16s. 1947. (Technical Press, Ltd.)

F. Gonseth. *La géométrie et le problème de l'espace. III. L'édification axiomatique.* Pp. 112. Sw. fr. 7.40. 1947. (Griffon, Neuchatel ; H. K. Lewis, London)

S. L. Green. *Dynamics.* Pp. 264. 10s. 6d. 1948. (University Tutorial Press)

L. W. Griffiths. *Introduction to the theory of equations.* 2nd edition. Pp. ix, 278. 1[illegible] 1947. (John Wiley, New York ; Chapman and Hall)

L. M. Kells. *Elementary differential equations.* 3rd edition. Pp. xiv, 312. $3. 194[illegible] (McGraw-Hill)

E. R. Kiely. *Surveying instruments. Their history and classroom use.* Pp. xiii, 41[illegible] N. p. 1947. Nineteenth Yearbook of the National Council of Teachers of Mathematics (Bureau of Publications, Teachers College, Columbia University, New York)

J. H. Lambert. *Opera Mathematica. II.* Edited by A. Speiser. Pp. xxix, 324. Ge[illegible] Sw. fr. 25. 1948. (Orell Füssli, Zürich)

H. V. Lowry and H. A. Hayden. *Introductory mathematics.* Pp. 159. 4s. 1948. (Longmans)

N. W. McLachlan. *Modern operational calculus.* Pp. xiv, 218. 21s. 1948. (Macmillan)

L. M. Milne-Thomson. *Theoretical aerodynamics.* Pp. xvii, 363. 40s. 1948. (Macmillan)

D. S. Nathan and O. Helmer. *Analytic geometry.* Pp. x, 402. $3.75. 1947. (Prentice-Hall, New York)

J. B. Sidgwick. *The heavens above.* Pp. xv, 282. 21s. 1948. (Geoffrey Cumberlege, Oxford University Press)

W. M. Smart. *John Couch Adams and the discovery of Neptune.* Pp. 56. 5s. 1947. (Royal Astronomical Society, Burlington House, London, W.1.)

E. S. Smith, M. Salkover and H. K. Justice. *Unified calculus.* Pp. x, 507. 21s. 194[illegible] (John Wiley, New York ; Chapman and Hall)

Sir John Townsend. *Electrons in gases.* Pp. viii, 166. 25s. 1948. (Hutchinson)

D. Williams. *A realistic approach to number teaching.* Pp. 95. 3s. 6d. 1948. (Geoffrey Cumberlege, Oxford University Press)

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ANNUAL GENERAL MEETING, BIRMINGHAM, 1949

ARRANGEMENTS have been made for the next Annual General Meeting of the Association to be held in **Birmingham,** from 20th to 23rd April, 1949. Through the courtesy of the University of Birmingham, accommodation and meals will be available for members.

MIDLAND BRANCH 1947–8.

President : Mr. K. L. Wardle.

Secretaries : Miss L. E. Hardcastle, Mr. A. Hinckley.

Treasurer : Mr. M. A. Porter.

Committee : Misses Barnes, Ray, Randle, Robinson, Messrs. Sealey, Moore, Cutting, E. V. Smith.

Papers were given as follows :

4th October. Mr. C. W. Tregenza, H.M.I., " The Teaching of Graphs ". A most stimulating and practical paper demonstrating the use of material from many branches of science, obtained by experiment and observation.

15th November. Mr. H. A. Petch on " The Standardisation of Marks ", enlightening us on the elimination of the disturbing effects of a large examining panel, the papers and in fact everything but the candidate in securing an absolute standard.

6th December. Mr. P. F. Burns, late H.M.I., dealing with " The Place of Astronomy in a School Course of Mathematics " explained how ordinary geometrical instruments could be used to give a surprisingly large amount of astronomical knowledge ; and described international cooperation of schools in making earth measurements.

31st January. Mr. A. Robson, " The Teaching of Geometry ", gave a resumé of the evolution of geometrical teaching in the present century and his own ideas of how the subject should be taught.

6th March. Mr. K. L. Wardle gave his Presidential Address on " The Lighter Side of Mathematics ", showing how some appreciation may be induced in our less promising pupils and stressing the fact that the important thing is not what we teach but the amount of thinking obtained from the pupils.

5th June. Mr. M. A. Porter dealt with " Some Assumptions in Mechanics " with special reference to Newton's Laws and Impact.

Miss L. E. Hardcastle spoke on " Introductory Geometry without Instruments ", using paper-folding, cardboard and needle with coloured threads.

QUEENSLAND BRANCH.

REPORT FOR THE YEAR 1947–1948.

The Annual Meeting was held at the University on 21st May, 1948. The Report and the Financial Statement for the year were presented and were adopted.

Two ordinary meetings were held at the University during the year. At the first, on 8th August, 1947, Mr. H. M. Finucan gave a paper on " Some Mathematical Puzzles ", and at the second, on 7th November, Mr. E. W. Jones read a paper on " The Teaching of Trigonometry ".

The number of members of this Branch is 32, of whom 10 are members of

the Mathematical Association (one a Life Member). There is also one junior member. The Financial Statement shows a credit balance of £19 10s. 4d. as at the end of the year. The *Mathematical Gazette* is circulated among Associate Members as it comes to hand. The thanks of members is due to those who take the trouble to prepare papers for meetings.

At the Annual Meeting, the President, Professor E. F. Simonds, gave an address on "Mathematical Induction".

The present committee is: *President*, Prof. E. F. Simonds; *Vice-Presidents*, Mr. R. A. Kerr, Mr. I. Waddle; *Hon. Sec. and Hon. Treasurer*, Assoc. Prof. J. P. McCarthy; *Members*, Miss E. H. Raybould and Messrs. J. C. Deeney, S. G. Brown, E. W. Jones, P. B. McGovern.

J. P. McCarthy, *Hon. Secretary.*

BOOKS RECEIVED FOR REVIEW.

H. V. Allen. *Commercial arithmetic.* School edition, revised. Pp. ix, 466. 8s. 1948. (Longmans)

J. W. Archbold. *An introduction to the algebraic geometry of a plane.* Pp. xiii, 300. 25s. 1948. (Arnold)

R. C. Archibald. *Mathematical table makers. Portraits, paintings, busts, monuments, bio-bibliographical notes.* Pp. 82. 1948. *Scripta Mathematica* Studies, 3. (*Scripta Mathematica*, Yeshiva University, New York, 33)

H. Athen. *Ebene und sphärische Trigonometrie.* Pp. 112. DM. 7.50. 1948. (Wolfenbütteler Verlagsanstalt)

H. Athen. *Vektorrechnung.* Pp. 90. DM. 6.50. 1948. (Wolfenbütteler Verlagsanstalt)

C. Attwood. *Practical five-figure mathematical tables.* Pp. v, 74. 3s. 1948. (Macmillan)

W. Blaschke. *Analytische Geometrie.* Pp. 152. DM. 10.50. 1948. (Wolfenbütteler Verlagsanstalt)

L. Brand. *Vector and tensor analysis.* Pp. xvi, 439. 33s. 1947. (John Wiley, New York; Chapman & Hall)

F. G. Brown. *Everyman's mathematics.* Pp. xviii, 747. 36s. 1947. (Angus & Robertson, Sydney and London)

B. R. Buckingham. *Elementary arithmetic. Its meaning and practice.* Pp. viii, 744. 24s. 6d. 1947. (Ginn)

H. S. Carslaw and J. C. Jaeger. *Operational methods in applied mathematics.* 2nd edition. Pp. xvi, 359. 20s. 1948. (Oxford)

J. B. Channon and A. McL. Smith. *A school algebra.* Pp. xi, 437, x. With answers 7s. 6d. 1948. (Longmans)

J. Chazy. *Cours de mécanique rationnelle. II. Dynamique des systèmes matériels.* 3rd edition. Pp. vi, 511. 1100 fr. 1948. (Gauthier-Villars)

A. Cohen. *An elementary treatise on differential equations.* Pp. vii, 337. 12s. 6d. 1948. (Heath, New York; Harrap)

A. Danjon. *Cosmographie.* Pp. 317; 32 plates. 1948. (Hatier, Paris)

C. V. Durell. *A first geometry for modern schools.* Pp. viii, 200, xvi. 4s. 9d. 1948. (Bell)

S. N. Forrest. *Mathematics for technical students. Junior Course.* 3rd edition. Pp. viii, 304. 5s. 6d. 1947. (Arnold)

R. J. Fulford. *Higher Certificate and Intermediate tests in pure mathematics.* 2nd edition. Pp. 127. 2s. 6d. 1948. (University Tutorial Press)

H. Hahn and A. Rosenthal. *Set functions.* Pp. ix, 324. $12. 1948. (University of New Mexico Press, Albuquerque, New Mexico)

H. Jeffreys. *Theory of probability.* 2nd edition. Pp. vii, 411. 30s. 1948. (Oxford)

L. O. Kattsoff. *A philosophy of mathematics.* Pp. ix, 266. $5. 1948. (Iowa State College Press, Ames, Iowa)

T. L. Kelley. *The Kelley statistical tables.* Revised edition. Pp. ix, 223. 27s. 6d. 1948. (Harvard University Press; Geoffrey Cumberlege, London)

A. S. Levens. *Nomography.* Pp. viii, 176. 18s. 1948. (John Wiley, New York; Chapman & Hall)

N. H. McCoy. *Rings and ideals.* Pp. xii, 216. 1948. Carus Mathematical Monographs, (Mathematical Association of America)

S. H. Moorfield and H. H. Winstanley. *Mechanics and applied heat, with electrotechnics.* nd edition. Pp. xi, 324, 64. 7s. 6d.; without electrotechnic section, 6s. 1948. (Arnold)

F. H. Newman and V. H. L. Searle. *The general properties of matter.* 4th edition. Pp. xi, l. 21s. 1948. (Arnold)

J. L. Prak. *Mathematical-technical test. Tests, cards and key.* (Harrap)

E. E. Preidel. *Intermediate hydrostatics.* Pp. 247. 9s. 6d. 1948. (University Tutorial Press)

T. Rado. *Length and area.* Pp. v, 572. $6.75. 1948. American Mathematical Society olloquium Publications, 30. (American Mathematical Society, New York)

J. F. Ritt. *Integration in finite terms. Liouville's theory of elementary methods.* Pp. vii, 00. 15s. 1948. (Columbia University Press; Geoffrey Cumberlege, London)

G. W. and R. M. Spenceley. *Smithsonian elliptic functions table.* Pp. iv, 366. 1947. mithsonian Institute, Washington)

G. H. Thomson. *The factorial analysis of human ability.* 3rd edition. Pp. xvi, 392. 0s. 1948. (University of London Press)

C. Truesdell. *An essay towards a unified theory of special functions.* Pp. iv, 182. 16s. 948. *Annals of Mathematics* Studies, 18. (Princeton University Press; Geoffrey umberlege, London)

C. O. Tuckey and W. Armistead. *New syllabus algebra.* Pp. viii, 201. 5s.; without nswers, 4s. 6d. 1948. (Cambridge)

C. O. Tuckey and F. J. Swan. *Geometry for Sixth Forms.* Pp. vi, 250. 7s. 6d. 1948. Longmans)

Annals of the Computation Laboratory of Harvard University.

7. *Tables of the Bessel functions of the first kind of orders* 10, 11, 12. 55s. 1947.
8. *Tables of the Bessel functions of the first kind of orders* 13, 14, 15. 55s. 1947.
9. *Tables of the Bessel functions of the first kind of orders* 16 *through* 27. 55s. 1948.
16. *Proceedings of a symposium on large-scale digital calculating machines.* Pp. xxix, 302. 55s. 1948.
17. *Tables for the design of missiles.* Pp. lv, 226. 50s. 1948.

(Harvard University Press; Geoffrey Cumberlege, London)

Tables of Bessel functions of fractional order. I. Prepared by the Computation Laboratory of the National Bureau of Standards. Pp. xli, 413. 1948. (Columbia University Press)

Guidance pamphlet in mathematics for high school students. Final Report of the Commission on post-war plans of the National Council of Teachers of Mathematics. Pp. 25. 5c.; orders of more than 10, 10c. each. 1947. (*Mathematics Teacher*, 525 W. 120th St., New York)

Mathematics. Our great heritage. Essays selected and edited by W. L. Schaaf. Pp. 91. $3.50. 1948. (Harper, New York)

AUCKLAND BRANCH.

Report for 1947.

Two very successful meetings were held in 1947. The first was addressed by Mr. Murdoch, who discussed the treatise that he is preparing entitled " Mathematics in Secondary Schools ". He described the different sections in this work, giving also the scope of each chapter. Many interesting points arose, in particular the weakness of many Training College students in mathematics and the fact that, as no arithmetic or mathematics is required in the Training College, it is possible for a teacher to be trained without his acquiring a greater knowledge of mathematics than the contents of Core Mathematics.

Mr. H. Henderson, now Chief Inspector of Post-primary Schools, addressed our second meeting, his subject being " The Place of Mathematics in Education ". The speaker outlined the changes in Secondary School mathematics which had come with the new curriculum. He very thoroughly discussed the place of Core Mathematics and justified the inclusion of statistics in Optional Mathematics. As a result of his criticism that " the needs of the sciences and of the applied sciences were such that the prescriptions which had so long remained unaltered for University Entrance and Entrance Scholarship were no longer adequate ", a committee was set up to consider the standard and prescriptions in these examinations.

Although membership of the Branch is not great, meetings are well attended. We have a number of country members, and our numbers are still on the increase.

E. H. Driver, *Hon. Sec.*

LIVERPOOL MATHEMATICAL SOCIETY.

(Liverpool Branch.)

Report for Session 1947–48.

The Branch was glad to welcome several new members during the year; membership was 73 in June 1948. Meetings throughout the year have been well attended, the maximum number present being 70.

The following meetings were held during the session :

October 13th. Mr. A. W. Sanford, of Liverpool College, gave his Presidential Address on " Maps and Mathematics ". He described the organisation and computation of a formal first-class survey, compared the various methods used, and discussed the accuracy obtained in filling in the detail of the map.

November 10th. Professor M. H. A. Newman, of Manchester University, in a talk on " Mathematics and Machines ", gave a vivid account of the nature of the problems raised by work with calculating machines. He showed the advantages of an iterative process, and analysed in detail the determination of a square root as the limit of a sequence.

December 8th. Mr. W. W. Sawyer, of the Leicester College of Technology, spoke on " The Teaching of Mathematics to Non-Mathematicians ". The main theme of this stimulating address was the necessity of arousing the interest of the non-mathematician before formal work could be started successfully. He had himself found that boys could always be intrigued by the use of models ; he admitted that girls presented a more formidable problem! A variety of models, covering a wide range of interests, were exhibited and discussed.

January 26th. Dr. C. Gattegno, of the London Institute of Education, in his address on " The Abstract in School Mathematics ", discussed some of the common mistakes made by children in elementary mathematics, and emphasised the necessity of the teacher understanding the cause of these

mistakes before he could usefully attempt a cure. It was important appreciate that each new idea introduced in algebra, for example, involve further degree of abstraction for the child.

March 1st. Mr. A. W. Siddons, speaking on "The Teaching of Ratio a other Elementary Topics", described the methods of teaching ratio wh were in use before the Society for the Reform of Geometrical Teaching (la the Mathematical Association) had done its good work. He told us of own early difficulties when he insisted on teaching the use of trigonomet and logarithmic tables at Harrow. Several points connected with mod methods in the teaching of ratio were discussed, and Mr. Siddons stressed advantages of introducing trigonometry at an early stage.

May 24th. Annual General Meeting.

Officers were elected for the Session 1948–49. *President:* Professor J. Whittaker; *Secretary:* Miss J. S. Batty; *Treasurer:* Mr. D. C. Gilles.

Mr. R. L. Plackett, of the Department of Applied Mathematics, gave talk on "The Teaching of Statistics in Schools". Mr. Plackett suggest that for a Sixth Form course in Statistics it was essential to use practi methods to illustrate statistical concepts. Instructive games were m valuable; for example, one could use the roulette wheel, the sample bott and games of darts, in all of which the class could take part. Tables "random numbers" could be used to form random samples from a norm population, and tests of significance could be illustrated.

In January the Branch received a parcel of food sent by Miss Gibbons behalf of the Victoria Branch of the Mathematical Association. The Bran welcomes this opportunity to express their keen appreciation of this gener gift, and sends grateful thanks and good wishes to the Victoria Branch.

J. S. Batty, *Hon. Secretary.*

MANCHESTER BRANCH.

Report for 1947–48.

Six meetings were held during the year.

The Annual General Meeting was held on 30th September, 1947, and t business of the meeting was followed by an address from the retiring Presid Miss Holman. Miss Holman's subject was "Mathematical Books for t Library Shelf". The lecturer gave an exhaustive and detailed review o large number of books which was greatly appreciated by her audience.

On 27th November the Branch heard Mr. W. F. Bushell on "A Century School Mathematics", and the audience was appreciatively entertained by series of anecdotes about the mathematical teachers of the past.

The Annual Joint Meeting with Manchester University Mathemati Society was held on 28th January. Professor A. G. Walker's subject w "Projective Geometry, with a finite number of points". This proved interesting exposition of what to many of us was a new approach to t teaching of projective geometry.

We were visited on 2nd March by Mr. P. F. Burns who addressed us on t subject of "Astronomy in a School Mathematics Course". The lecturer ga some interesting demonstrations of practical calculations in the region spherical trigonometry, which indicated that this subject could, with pro be introduced into a junior course.

On 11th May, Mr. J. A. Clayton spoke to us on "An Approach to t Teaching of Rotational Inertia". The speaker stressed the difficulty, wh faced newcomers to the sixth form, in obtaining a conception of "Rotation Inertia", and proceeded to show that the concept could be developed analogy from dynamical equations of pure translations.

The final meeting of the session was held on 19th July with a discussion of the mathematical papers set in the N.U.J.M.B. examinations of 1948. Generally, the papers were found satisfactory. A small number of criticisms was forwarded to the Northern Provincial Education Sub-Committee.

G. E. LANIGAN, *Hon. Sec.*

SHEFFIELD AND DISTRICT BRANCH.

THE following meetings were held during the Session 1947–48.

October 7th, 1947. Mr. J. Gagan, Firthpark Grammar School, Sheffield, spoke on "Informal Methods in the Teaching of Mathematics". In an absorbing lecture the speaker outlined novel methods of introducing many familiar results, and demonstrated his own collection of beautifully-constructed models.

November 26th, 1947. Mr. J. A. Petch, Secretary of the Joint Matriculation Board, spoke on the subject "School Certificate and Higher School Certificate Standardisation". Mr. Petch explained that the final examination results were always the product of many different factors, and indicated where control, in the form of standardisation, was necessary. He outlined the methods whereby the Joint Matriculation Board exercise this control.

January 21st, 1948. Annual General Meeting. The business meeting was followed by a lecture by Professor A. G. Walker, University of Sheffield, entitled "Finite Geometry". Professor Walker explained the difficulties in teaching the process of abstraction, and suggested that Finite Geometry might be a suitable medium for such an introduction. He then gave examples of systems where space contained only a finite number of points, and showed that the Axioms of Projective Geometry were all satisfied. All the usual familiar results of Projective Geometry could be demonstrated, and there was an underlying Finite Algebra which would enable us to build up an Analytic Representation of the Geometry.

April 21st, 1948. Mr. W. Hope-Jones spoke on "Can we teach more Mathematical Geography?" Mr. Hope-Jones made suggestions for pruning the normal Mathematics Syllabus, especially for weak pupils, and put forward a plea for the mathematics of the sphere. He dealt with the general question of angle measurement, with latitude and longitude, and worked a number of interesting examples of the determination of the distance between two points on the earth's surface.

May 25th, 1948. Mr. J. F. Hinsley, Edgar Allen & Co., Ltd., Sheffield, spoke on "Industrial demands on Mathematical Training". After giving examples of everyday applications of elementary mathematics, including a surprising application of Pappus' Theorem, Mr. Hinsley dealt more fully with the problem of Heat Flow in connection with the Forging of Heavy Castings. The lecture was illustrated by many lantern slides of considerable interest.

In addition to these meetings, about thirty members enjoyed a pleasant social evening together on Friday, 5th December, 1947, when the Branch welcomed Professor and Mrs. A. G. Walker to Sheffield. Following high tea at Messrs. Field's Café, Sheffield, the party visited the Sheffield Playhouse.

The ordinary meetings have been well attended and membership maintained.

Officers. President: Mr. R. R. S. Cox; Vice-Presidents: Professor A. G. Walker, Dr. J. R. Thompson, M.C.; Honorary Treasurer: Mr. J. W. Cowley.

C. R. BARWELL, *Hon. Secretary.*

THE EDUCATION AND TRAINING OF TECHNOLOGISTS.

FOLLOWING the Percy Report on *Higher Technical Education* and the Parliamentary and Scientific Committee's Report on *Colleges of Technology and Technological Manpower*, the Institute of Physics set up a committee under the chairmanship of Dr. H. Lowery, and has now issued the report of this committee under the above title. To summarise the findings and proposals of this report without extensive quotation is not easy; those who wish to read the document in full may obtain copies gratis from the Institute of Physics, 47 Belgrave Square, London, S.W. 1.

The formation of the committee was due to disagreement with the methods which had been proposed for increasing the supply of trained technologists for industry, although the need for such an increase is freely admitted. The main disagreement is threefold, that some radical difference from present methods is essential, that short-term palliatives will unduly delay the establishment of a rational scheme without producing any significant interim improvement, and that difficulties in the way of inaugurating a rational system of technological education are grossly over-emphasised.

The main proposal of the report is the speedy creation of a number of well-equipped and well-staffed Colleges of Technology, independent of, but of status comparable with, the Universities. Their geographical location, and the nature of their departments and courses, should correspond generally to the distribution of industry. Courses should normally be full-time, of three years' duration, with entry at something like present Intermediate level. They should lead to an award, and a degree of B.Tech. is suggested. "Junior" instruction should not be given, but postgraduate study, and research upon technological problems, should be encouraged. Some instruction in "pure" science, including mathematics, would of course be a necessary part of these courses.

It is hoped that the above brief summary fairly outlines the proposals. As regards comment, what follows must be regarded as the present writer's purely personal opinions.

The proposals appear to me to be based upon a false dichotomy as between "pure" science and technology. Surely the need is that the interdependence of and interplay between them should be more clearly and more generally recognised; any course which tends still further to dissociate them will be a disservice to both.

Agreeing generally with the conviction expressed in the report that there is room for improvement in *quality* and *type* of technological training now available, my experience leads me to doubt the existence of an untapped reservoir of potential students of the right quality and type.

The staffing of such Colleges is perhaps the crucial problem, and the difficulty is likely to be increased by a policy which would seem entirely to banish technology from the Universities. As regards teachers of mathematics in technical schools and colleges, a report on their training has been prepared by the Technical Sub-Committee of the G.T.C. of the Mathematical Association, and is ready for printing.

At the same time, the boldness of the suggestions can be admired, and complete agreement can be recorded with an attitude of mind which refuses to allow expediency to hamper or difficulty to daunt the execution of a course of action which is believed to be right.

18*th May*, 1948. W. G. BICKLEY

PLYMOUTH AND DISTRICT BRANCH.

Report of the Session 1947–48.

The first meetings of the year, held at Exeter on 4th November and at Plymouth on the following day, were addressed by Mr. P. F. Burns on the subject: "The Place of Astronomy in a School Course of Mathematics". Both meetings were well attended, and Mr. Burns brought to the South-west his inimitable and enthusiastic treatment of the subject, so much appreciated at the General Meeting of the Mathematical Association in 1947.

The Annual General Meeting was held at Plymouth on 25th November. Mr. V. Naylor, M.Sc., was elected President for 1948; Dr. M. Stimson and Professor T. A. Brown were elected Vice-Presidents; Mr. W. G. Tamlin, B.Sc., was re-elected Secretary and Treasurer.

The business meeting was followed by the Presidential Address. Professor T. A. Brown, M.A., B.Sc., F.R.S.E., of the University College of the South-West, chose as his subject: "The Elementary Treatment of Maxima and Minima".

Professor Brown later repeated his address for the benefit of our members in the Exeter district on 3rd February, 1948.

On 25th February the Secretary exhibited a number of Film Strips, including Pythagoras' Theorem, Introduction to Graphs, the Football Field, and the Bicycle, all of which have been noted in the *Gazette*. A lively discussion followed on the subject of films as an educational medium, with particular reference to those shown.

This exhibition was repeated in Exeter on 2nd March, and was again followed by considerable discussion.

On 10th March Dr. J. Goodier of St. Luke's College, Exeter, was to have given a lecture at Plymouth on the M.K.S. System of Units. Dr. Goodier, however, was taken ill rather suddenly while lecturing in London, and this lecture had to be postponed. Mr. J. Williams, M.Sc., who was giving a lecture at Exeter on High Speed Fluid Motion, very kindly consented to take Dr. Goodier's place, and a small Plymouth audience profited by Mr. Williams' account of the mathematical treatment of the flow of air around solid objects penetrating the "sonic barrier". This talk was repeated at Exeter on 16th March.

Mr. A. P. Rollett collected together a number of the models he showed at the Annual General Meeting of the Association in 1945, and augmented by some recent additions used them to very good effect to illustrate a fascinating lecture on "Mathematical Models". Mr. Rollett gave this lecture in Exeter on 13th April, and travelled to Plymouth to grip a second audience on the following evening.

The session was concluded rather late this year by a very interesting contribution by Miss L. E. Hardcastle, who chose as her subject: "A Practical Approach to Elementary Mathematics". The Secretary takes credit for persuading Miss Hardcastle to frame a short talk around those fascinating examples of coloured thread designs which were shown at the Annual General Meeting of 1947, and to travel to the South-West to entertain audiences at Exeter and at Plymouth.

This session has been the most successful for the Plymouth and District Branch since its activities were seriously curtailed by the war. Its total membership of 36 full members and 6 associate members could be increased to well over the 50 mark if members who have joined the Branch would remember to renew their subscriptions in time.

As shown in this report, efforts have been made to meet the needs of members in the Plymouth and Exeter districts, and it is hoped to include

other centres in Devon and Cornwall as the venue of some of the meetings of the Branch. The Secretary would be pleased to hear from any member resident in the South-West in connection with this suggestion.

W. G. TAMLIN, *Honorary Secretary.*

SOUTH-WEST WALES BRANCH.

REPORT FOR 1947–8.

ON 7th December, 1947, Mr. H. J. Godwin, Lecturer in Mathematics at Swansea University College, gave an address entitled " An Outline of Statistics with reference to School Courses ". After indicating briefly the parts of Statistics which could be dealt with in schools, Mr. Godwin made a plea for its inclusion on grounds of its intrinsic educational value, not merely as part of Mathematics, but as a means of teaching caution in the making of inferences and of appreciating the significance of approximations.

On 6th March, 1948, the Branch was honoured by a visit from Mr. A. W. Siddons, a past Chairman of the Association, who spoke on " Some of the Changes in Mathematical Teaching in the Last Fifty Years ". He described the improvements that had taken place, particularly in the teaching of Geometry, the overthrow of Euclid, the increased use of riders, the early introduction of Trigonometry, etc., and stressing the need for continual experiment, gave an account of modern trends. The lecture was especially valuable to the younger members.

6th May, 1948. Through the courtesy of Mr. W. Flemming, a number of members were enabled to attend the lecture on " Visual Aids in the Teaching of Mathematics " given by Mr. R. H. Collins at Trinity College, Carmarthen and to inspect the vast array of models he had brought with him.

29th May, 1948. Mr. C. C. Hurst (of Educational Publicity, Ltd.) gave a demonstration of three Mathematical Film Strips : the Football Field, the Bicycle, and Chess. They aroused considerable interest and keen discussion.

The thanks of the Branch are due to the Victoria Branch for the receipt early in 1948, of a food parcel, which was put to good use.

Also to Mr. S. Davies for his services as Branch Chairman over a long period. Miss H. M. Cameron has been appointed Branch President for 1948–9.

Number of Members, 14. Number of Associates, 18.

T. G. FOULKES, *Hon. Sec.*

INTERNATIONAL CONGRESS OF MATHEMATICIANS.

AN International Congress of Mathematicians will be held in Cambridge, Massachusetts, from August 30 to September 6, 1950, under the auspices of the American Mathematical Society. The Society originally planned to act as host for a Congress in September, 1940, which was also scheduled to meet in Cambridge. However, the outbreak of World War II made it necessary to postpone the Congress and, consequently, there has been no international gathering of mathematicians since 1936. It is the sincere hope of the American Mathematical Society that the gathering in 1950 will be a truly international one, with all countries well represented. The Council of the American Mathematical Society has voted unanimously to hold a Congress which will be open to mathematicians of all national and geographical groups.

Time and Place. The dates for the Congress have been fixed as August 30–September 6, 1950. Harvard University will be the principal host institution. A number of other institutions in metropolitan Boston will join in the entertainment of Congress visitors by arranging special features on their campuses

Type of Congress. In recent years mathematicians have been much impressed by the success of the conference method for presenting recent research in fields in which vigorous advances have just been made or are in progress. The 1950 Congress will include Conferences in several fields. Following established custom, there will also be a number of invited hour addresses by outstanding mathematicians. In addition, sectional meetings for the presentation of contributed papers not included in Conference programmes will be held in the following fields : I, Algebra and Theory of Numbers ; II, Analysis ; III, Geometry and Topology ; IV, Probability and Statistics, Actuarial Science, Economics ; V, Mathematical Physics and Applied Mathematics ; VI, Logic and Philosophy ; VII, History and Education.

The official languages of the 1950 Congress will be English, French, German, Italian and Russian.

Organisation. The plans for the Congress are under the supervision of an Organising Committee which was elected by the Council of the American Mathematical Society in February, 1948. The Chairman is Professor Garrett Birkhoff of Harvard University, and the Vice-Chairman is Professor W. T. Martin of Massachusetts Institute of Technology. Professor J. R. Kline of the University of Pennsylvania has been named Secretary of the Congress.

Entertainment. Harvard University has offered the use of its dormitories and dining-rooms for mathematicians and their guests for the period of the Congress. The Organising Committee hopes that it will be possible to furnish board and room without charge to all mathematicians from outside the North American continent who are members of the Congress. Congress membership fees will be announced well in advance of the opening of the Congress. Every effort will be made to facilitate the travel at reasonable cost of foreign participants while in the United States.

Information. Detailed information will be sent in due course to mathematical societies and academies for communication to their membership. Individuals interested in receiving information may file their names in the office of the American Mathematical Society. Communications should be addressed to the American Mathematical Society, 531 West 116th Street, New York City 27, U.S.A.

THE ORGANISING COMMITTEE.

BOOKS RECEIVED FOR REVIEW.

A. D. Booth. *Fourier technique in X-ray organic structure analysis.* Pp. vii, 106. 12s. 6d. 1948. (Cambridge)

H. S. M. Coxeter. *Regular polytopes.* Pp. xix, 321. 50s. 1948. (Methuen)

A. Hess. *Praktische Mathematik.* Pp. 116. Sw. fr. 8.90. 1947. (Rascher Verlag, Zürich)

E. Hille. *Functional analysis of semi-groups.* Pp. xi, 528. $7.50. 1948. American Mathematical Society Colloquium Publications, 31. (American Mathematical Society)

W. V. Houston. *Principles of mathematical physics.* 2nd edition. Pp. xii, 363. 30s 1948. (McGraw-Hill)

V. Inglada. *Metodos para la resolucion de los problemas geometricos.* Pp. 477. 110 pesetas. 1948. (Dossat, Madrid)

M. G. Kendall. *Rank correlation methods.* Pp. vii, 160. 18s. 1948. (Griffin)

L. Locher-Ernst. *Differential- und Integralrechnung in Hinblick auf ihre Anwendungen.* Pp. 594. Sw. fr. 48. 1948. (Birkhäuser, Basle)

W. Magnus und **F. Oberhettinger.** *Formeln und Sätze für die speziellen funktionen der mathematischen Physik.* 2nd edition. Pp. viii, 230. Dm. 24.60. 1948. Die Grundlehren der mathematischen Wissenschaften, 52. (Springer, Berlin)

G. P. Meredith. *Algebra by visual aids. I. Polynomials. II. The continuum. III. The laws of calculation. IV. Choice and chance.* 10s., 8s. 6d., 7s. 6d., 9s. 6d. *Answers* 6s. 1948. (Allen and Unwin)

N. Miller and **R. E. K. Rourke.** *Plane trigonometry and statics.* Pp. xii, 427. $1.65. 1946. *An advanced course in algebra.* Pp. xv, 394. $1.35. 1947. (Macmillan Company, Canada)

E. A. Milne. *Kinematic relativity.* Pp. vi, 238. 25s. 1948. (Geoffrey Cumberlege, Oxford University Press)

E. A. Milne. *Vectorial mechanics.* Pp. xiii, 382. 36s. 1948. (Methuen)

J. von Neumann. *Les fondements mathématiques de la mécanique quantique.* Pp. 336 10s. 6d. 1946. (Centre National de la Recherche scientifique, Paris; London agents, H. K. Lewis)

G. H. R. Newth. *Mental arithmethic. Revision and speed tests for secondary schools.* Pp. 48. 2s. 6d. 1948. (Macdonald)

C. G. Nobbs. *Elementary calculus and coordinate geometry. I.* Pp. 255. 12s. 6d 1948. *II.* Pp. 399. 17s. 6d. 1949. (Oxford University Press)

O. Ore. *Number theory and its history.* Pp. x, 370. 27s. 1948. (McGraw-Hill)

J. L. Prak. *Mathematical and technical tests manual.* Pp. 30. 3s. 6d. 1948. (Harrap)

A. Robson. *Examples in mathematics for fifth and lower sixth forms.* Pp. 63. 2s. 6d. 1948. (Bell)

D. E. Rutherford. *Substitutional analysis.* Pp. xi, 103. 25s. 1948. (University of Edinburgh Press)

M. Savage. *Sport with figures.* Pp. 38. 3s. post free. (Savage, Upper Basildon, Reading)

J. B. Scarborough and **R. W. Wagner.** *Fundamentals of statistics.* Pp. vii, 144. 13s. 1948. (Ginn)

J. Schillinger. *The mathematical basis of the arts.* Pp. x, 696. $12. 1948. (Philosophical Library, New York)

B. Segre. *Lezioni di geometria moderna. I. Fondamenti di geometria sopra un corpo qualsiasi.* Pp. iv, 195. L.1200. 1948. (Zanichelli, Bologna)

J. V. Uspensky. *Theory of equations.* Pp. vii, 353. 27s. 1948. (McGraw-Hill)

H. S. Wall. *Analytic theory of continued fractions.* Pp. xiii, 433. 36s. 1948. (Van Nostrand, New York; Macmillan, London)

A. N. Whitehead. *An introduction to mathematics.* 12th impression. Pp. 191. 5s. 1948. (Geoffrey Cumberlege, Oxford University Press)

Sir Edmund Whittaker. *The modern approach to Descartes' problem.* Herbert Spencer Lecture. Pp. 30. 1s. 6d. 1948. (Nelson)

G. E. Williams. *Technical literature, its preparation and presentation.* Pp. 117. 7s. 6d. 1948. (Allen and Unwin)

Addition and subtraction facts and processes. Pp. 66. 1s. 1948. Publications of the Scottish Council for Research in Education, 28. (University of London Press)

The Lewis Carroll Puzzle Book. Edited by D. B. Eperson. Pp. 32. 2s. 6d. 1948. (Appeal Office, 97 Crane Street, Salisbury, Wilts)

Tables of the Bessel functions of the first kind of orders 28 *through* 39. Pp. 694. 55s. 1948. Annals of the Computation Laboratory, Harvard University, X. (Harvard University Press; Geoffrey Cumberlege, London)

The collected works of J. Willard Gibbs, I, II. Rep. Pp. xxviii, 434; xviii, 207, vi, 284. $8. 1948. (Yale University Press; Geoffrey Cumberlege, London)

COMPUTATION OF TABLES

The London Mathematical Society needs assistance for extending a mathematical table of the late Col. Cunningham. Slight knowledge of Theory of Numbers desirable but not essential. Reasonable fees will be paid. Apply to Dr. Western, Windwhistle, Grayshott, Hindhead, Surrey.

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